REMARKS/ARGUMENTS

General comments:

The use of opposing layers of hard magnetized material that flank the free layer, serving to give it longitudinal stability, has been standard practice in the art for some time. Both the cited prior art and the present invention teach ways to further improve stability of this type. However, they take quite different approaches to achieving this.

The present invention teaches a method for improving the stability of the free layer through the introduction of a second pair of stabilizing layers, located either above or below the standard stabilizing layer and magnetizing it in a direction that is antiparallel to that of the first bias layer, thereby magnetostatically canceling out most of the external field of the first bias layer.

The cited prior art stabilizes the free layer directly by magnetically pinning it at its edges through use of an anti-parallel coupled layer structure similar to the way that the pinned layer in a spin valve is formed.

Reconsideration is requested of all rejections based on 35 U.S.C. 102:

The following features of the present invention, already contained in our claims, are not part of, or described by, the cited prior art:

(1) Layer 1, the bias layer that is closest to the free layer, abuts it with no overlap. The equivalent layer in Gill (bilayer 130/134) rests on (i.e. overlaps) the free layer and does not abut it. We have amended claims 1, 9, 17, and 25 to further emphasize this point.

(2) The horizontal gap in layer 2 (the additional bias layer) is less than the gap in layer 1. In Gill, the reverse is true.

(3) The separation between layers 1 and 2 is 50 to 300 Angstroms which is too great for effective anti-parallel coupling, as required by Gill.

(4) Layer 1 is thicker than layer 2. In Gill, the reverse is true.

Reconsideration is requested of all rejections based on 35 U.S.C. 103:

With regard to claims 9 and 25, we agree that Gill could have located his free layer at the bottom of the GMR stack in which case his layer 142 would have had to be below the permanent magnet layers. Such a change in geometry does not, however, overcome any of the differences between Gill and the present invention that we have listed supra.

With regard to claims 2, 13, 21, and 29, these claims teach materials that are suitable for use in secondary bias magnets. The first three listed, CoPt, CoCrPt, and CoNiCr, are magnetically hard materials suitable for use in hard bias magnets while the remaining two, NiFe/IrMn and CoFe/IrMn are laminates of a soft magnetic material on an antiferromagnetic underlay. The latter two materials will sustain an external bias field between two instances of themselves. This is NOT true of the synthetic antiferro-magnetic structures used by Gill to stabilize his free layer.

Claims 3-8 are all dependent on claim 1 and stand or fall with it. Claims 10-12 and 14-16 are all dependent on claim 9 and stand or fall with it. Claims 18-20 and 22-24 are all dependent on claim 17 and stand or fall with it. Claims 26-28 and 30-32 are all dependent on claim 25 and stand or fall with it.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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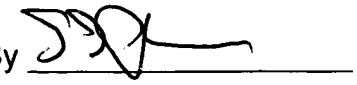
By 

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